

# Journal of Biology and Earth Sciences

Volume 1

Number 1

July-December 2011

ISSN: 2084-3577



## Journal of Biology and Earth Sciences

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Photo on the cover: *Leontopodium alpinum* on the limestone. Tatra Mountains, Poland. Author: Tomasz M. Karpiński

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# Supernumerary teeth in clinical practice

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## ABSTRACT

**Introduction:** Hyperdontia is the condition of having supernumerary teeth, or teeth which appear in addition to the regular number of teeth. The prevalence rates of supernumerary teeth in the permanent dentition amounts 0.1-6.9%, and in deciduous dentition 0.4-0.8%. The presence of supernumerary teeth can be found in everyday dental practice.

**Case presentation:** We describe 3 cases of patients with supernumerary teeth. First patient had supernumerary lateral incisor 12s, second - premolar fused, multicuspid, supernumerary deciduous tooth 64s of having several interconnected roots, and third - erupted odontoma between teeth 13 and 14. In all cases treatment involved the removal of the supernumerary tooth.

**Conclusions:** The decision on proceeding with the supernumerary teeth should be based on the full clinical picture and interview. Early diagnosis and removal of supernumerary teeth allow to avoid or reduce possible complications.

**Key words:** Hyperdontia, supernumerary teeth, supernumerary incisors, fused teeth, odontoma.

J Biol Earth Sci 2011; 1(1): M1-M5

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Original Submission: 05 June 2011; Revised Submission: 27 June 2011; Accepted: 01 July 2011

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ISSN: 2084-3577

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## INTRODUCTION

Hyperdontia is a rare alteration of odontogenesis defined as the presence of any tooth or tooth substance in excess of the normal dental formula.

The prevalence rates of supernumerary teeth in the permanent dentition, reported in the literature, vary between 0.1 and 6.9% [1-6]. In deciduous teeth, prevalence is lower amounting to 0.4-0.8% [4-7].

The presence of supernumerary teeth may be part of developmental disorders. The most common syndromes that show a significant incidence of multiple supernumerary teeth are cleft lip and palate (16.7% of patients) [8], Gardner's syndrome [9] and cleidocranial dysostosis [10].

Sexual dimorphism in hyperdontia is reported by most authors, with males being more commonly affected. The reporting rates of between 1.1:1 and 6.5:1 are depending on the respective population [1, 3-6, 11-13].

Supernumerary teeth are classified according to their morphology and location. In the permanent dentition, there are four different morphological types: conical, tuberculate, supplemental and odontoma [7].

Area particularly predisposed to the formation of the supernumerary teeth is the maxillary anterior region. The most often supernumerary teeth are observed in the central incisors region (so-called mesiodens). Backman and Wahlin make known, that in the chosen Swedish children population as much as 78% of supernumerary teeth are mesiodens [14]. According to studies in the general population they appear in 0.15-1.9% [3-6, 14-16]. Next in relation to the occurrence frequency are supernumerary premolars (0.034-0.84% of the population) [3-6, 17]. Supernumerary teeth in the molar region are usually rudimentary paramolars or distomolars [18-20]. Fourth molars are very rare disorder relating to the teeth number and usually their presence is noticed not until on the radiographs [3, 6, 21, 22].

## CASE PRESENTATION

### Case 1

An 13-year-old female presented with an erupted tooth on the palate. The patient, despite his young age, pay attention to the health and appearance of their teeth. This tooth was a supernumerary lateral incisor 12s situated palatally just outside the arch.

At the same time was a slight rotation of teeth 11 and 12 (Fig. 1). Treatment involved the removal of the supernumerary tooth. The patient was referred for further orthodontic treatment.



Fig. 1. Case 1 - supernumerary lateral incisor 12s situated palatally.

### Case 2

An 7-year-old female was referred by the orthodontist to extract the premolar supernumerary 64s deciduous tooth (Fig. 2). The tooth was located vestibularly. At the same time deciduous premolars 64 and 65 were moved in the palatal direction. Treatment involved the removal of the supernumerary tooth. Tooth 64s had features of fused, multicuspid tooth of having several interconnected roots.



Fig. 2. Case 2 - extracted supernumerary fused, deciduous premolar 64s.

### Case 3

An 24-year-old female reported for the purpose of re-endodontic treatment of tooth 14. In a clinical examination, between teeth 13 and 14, found a small additional tooth, which was defined as



odontoma (Fig. 3). The diagnosis of odontoma was confirmed by X-ray photograph and after-extraction examination. Treatment involved the removal of the odontoma, next endodontic treatment and prosthetic restoration of tooth 14.



Fig. 3. Case 3 - radiogram of erupted odontoma between teeth 13 and 14.

## DISCUSSION

The etiology of hyperdontia is not completely understood. Various theories exist. One theory suggests that the supernumerary tooth is created as a result of a dichotomy of the tooth bud. Another theory, suggests that supernumeraries are formed as a result of local, independent, conditioned hyperactivity of the dental lamina. Heredity may also play a role, because supernumeraries are more common in the relatives of affected children than in the general population [23, 24].

The cases described above represent a small sample of the possible presentations for cases involving supernumerary teeth. Most cases of supernumerary teeth does not give clinical symptoms, they are detected during radiographic examination, incidentally [25]. Supernumerary teeth may erupt regularly in the oral cavity or be retained in the jaw. Eruption frequency is reported to vary between 15 and 34% in the permanent dentition [26], while in the milk dentition about two-thirds of

the supernumeraries erupt [26, 27]. In case of our patients all supernumerary teeth were erupted.

Supernumerary teeth may cause the following clinical problems: failure of eruption, displacement or rotation, crowding, abnormal diastema or premature space closure, dilacerations, delayed or abnormal root development of permanent teeth, cystic formation and ectopic eruption [7, 11, 18, 19, 23, 27-31]. Our patients had supernumerary teeth exclusively in maxilla, with predilection for the anterior and premolar region. At the same time in each of these cases noted clinical problems, particularly rotation or displacement of surrounding teeth.

Supernumerary teeth are more often found in males than females [1, 3-6, 11-13]. In our study all patients were female. It is possible that females compared to males, more likely report to the dentist, noting abnormal appearance of the teeth and wanting to improve this.

One from our patients (Case 3) had supernumerary tooth diagnosed as odontoma. Odontoma is a category of supernumerary teeth, not universally accepted. Odontomas are benign odontogenic tumors composed of enamel, dentine, cement and pulp tissue. They are usually clinically asymptomatic, but often associated with tooth eruption disturbances. In exceptional cases the odontoma erupts into the mouth [32], and such exception was at our patient.

Treatment of hyperdontia depends on the respective case. In all cases of our patients supernumerary tooth extraction was performed. In the permanent dentition with regard to the possible complications it is advisable to remove supernumerary teeth, including those not erupted [18, 19]. In cases of normal eruption and settings of supernumerary teeth, when they do not cause disturbances of the arc regularity it is possible to desist from this rule.

The final decision about the need to remove should undertake the physician, after clinical and radiographic image consideration. Therefore, prior to treatment should be performed panoramic radiogram, and in case of doubt additionally dental or occlusal X-ray.

## CONCLUSIONS

The decision on proceeding with the supernumerary teeth should be based on the full

clinical picture and interview.

Early diagnosis and removal of supernumerary teeth allow to avoid or reduce possible complications.

## REFERENCES

1. Davis PJ. Hypodontia and hyperdontia of permanent teeth in Hong Kong schoolchildren. *Community Dent Oral Epidemiol* 1987; 15(4): 218-220.
2. Yusof WZ. Non-syndrome multiple supernumerary teeth: literature review. *J Can Dent Assoc* 1990; 56(2): 147-149.
3. Salcido-García JF, Ledesma-Montes C, Hernández-Flores F, Pérez D, Garcés-Ortiz M. Frequency of supernumerary teeth in Mexican population. *Med Oral Patol Oral Cir Bucal* 2004; 9(5): 403-409.
4. Esenlik E, Sayin MO, Atilla AO, Ozen T, Altun C, Başak F. Supernumerary teeth in a Turkish population. *Am J Orthod Dentofacial Orthop* 2009; 136(6): 848-852.
5. Schmuckli R, Lipowsky C, Peltomäki T. Prevalence and morphology of supernumerary teeth in the population of a Swiss community. Short communication. *Schweiz Monatsschr Zahnmed* 2010; 120(11): 987-993.
6. Celikoglu M, Kamak H, Oktay H. Prevalence and characteristics of supernumerary teeth in a non-syndrome Turkish population: associated pathologies and proposed treatment. *Med Oral Patol Oral Cir Bucal* 2010; 15(4): e575-578.
7. Garvey MT, Barry HJ, Blake M. Supernumerary teeth - an overview of classification, diagnosis and management. *J Can Dent Assoc* 1999; 65(11): 612-616.
8. Al Jamal GA, Hazza'a AM, Rawashdeh MA. Prevalence of dental anomalies in a population of cleft lip and palate patients. *Cleft Palate Craniofac J* 2010; 47(4): 413-420.
9. Ramaglia L, Morgese F, Filippella M, Colao A. Oral and maxillofacial manifestations of Gardner's syndrome associated with growth hormone deficiency: case report and literature review. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2007; 103(6): e30-34.
10. Richardson A, Deussen FF. Facial and dental anomalies in cleidocranial dysplasia: a study of 17 cases. *Int J Paediatr Dent* 1994; 4(4): 225-231.
11. Mitchell L, Bennett TG. Supernumerary teeth causing delayed eruption--a retrospective study. *Br J Orthod* 1992; 19(1): 41-46.
12. Högstrom A, Andersson L. Complications related to surgical removal of anterior supernumerary teeth in children. *ASDC J Dent Child* 1987; 54(5): 341-343.
13. So LL. Unusual supernumerary teeth. *Angle Orthod* 1990; 60(4): 289-292.
14. Backman B., Wahlin YB. Variations in number and morphology of permanent teeth in 7-year-old Swedish children. *Int J Paediatr Dent* 2001; 11(1): 11-17.
15. Stellzig A, Basdra EK, Komposch G. Mesiodentes: incidence, morphology, etiology. *J Orofac Orthop* 1997; 58(3): 144-153.
16. Russell KA., Folwarczna MA. Mesiodens - diagnosis and management of a common supernumerary tooth. *J Can Dent Assoc* 2003; 69(6): 362-366.
17. Rubenstein L., Lindauer S., Isaacson R., Germane N. Development of supernumerary premolars in an orthodontic population. *Oral Surg* 1991; 71(3): 392-395.
18. Hattab FN, Yassin OM, Rawashdeh MA. Supernumerary teeth: report of three cases and review of the literature. *ASDC J Dent Child* 1994; 61(5-6): 382-393.
19. Timocin N, Yalcin S, Ozgen M, Tanyeri H. Supernumerary molars and paramolars. *J Nihon Univ Sch Dent* 1994; 36(2): 145-150.
20. Zhu JF, Marcushamer M, King DL, Henry RJ. Supernumerary and congenitally absent teeth: a literature review. *J Clin Pediatr Dent* 1996; 20(2): 87-95.
21. Nagaveni NB, Umashankara KV, Radhika NB, Praveen Reddy B, Manjunath S. Maxillary paramolar: report of a case and literature review. *Arch Orofac Sci* 2010; 5(1): 24-28.
22. Serrano J. Geminatio, hypodontia and supernumerary teeth. *Oral Surg* 1986; 62(6): 737-738.
23. Liu JF. Characteristics of premaxillary supernumerary teeth: a survey of 112 cases. *ASDC J Dent Child* 1995; 62: 262-265.
24. Levine N. The clinical management of supernumerary teeth. *J Can Dent Assoc* 1961; 28: 297-303.
25. Bayrak S, Dalci K, Sari S. Case report: Evaluation of supernumerary teeth with computerized tomography. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2005; 100(4): e65-69.
26. Rajab LD, Hamdan MA. Supernumerary teeth: review of the literature and a survey of 152 cases. *Int J Paediatr Dent* 2002; 12(4): 244-254.
27. Humerfelt D, Hurlen B, Humerfelt S. Hyperdontia in children below four years of age: a radiographic study. *ASDC J Dent Child* 1985; 52(2): 121-124.
28. Zilberman Y, Malron M, Shteyer A. Assessment of 100 children in Jerusalem with supernumerary teeth in the premaxillary region. *ASDC J Dent Child* 1992; 59(1): 44-47.
29. Gregg TA, Kinirons MJ. The effect of the position and orientation of unerupted premaxillary supernumerary teeth on eruption and displacement of permanent incisors. *Int J Paediatr Dent* 1991; 1(1): 3-7.

30. Tay F, Pang A, Yuen S. Unerupted maxillary anterior supernumerary teeth: report of 204 cases. *ASDC J Dent Child* 1984; 51(4): 289-294.
31. Erkmen N, Olmez S, Onerci M. Supernumerary tooth in the maxillary sinus: case report. *Aust Dent J* 1998; 43(6): 385-386.
32. Serra-Serra G, Berini-Aytés L, Gay-Escoda C. Erupted odontomas: A report of three cases and review of the literature. *Med Oral Patol Oral Cir Bucal* 2009; 14(6): E299-303.



# Petrographic characteristics of rocks with magnetite deposits of Vrbno (Jesieniki - Czech Republic)

## Petrograficzna charakterystyka skał ze złoża magnetytu z Vrbna (Jesieniki - Czechy)

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### ABSTRACT

*Introduction:* The subject of this paper is a study the metamorphite shists from the old mines around the Mala Moravka-Karlova Studianka in which is magnetite ore, with ferrous chlorites present.

*Materials and methods:* Samples were taken directly from the reservoir and the surrounding of the ore, then the samples were observed in the microscope in transmitted and reflected light, and were carried out X-ray analysis of XRD and SEM-EDS.

*Results:* In the quartz-chlorite slates occur fibroblastic structure with numerous microfolds. X-ray analysis of rocks indicates the presence of calcite, quartz and ferrous chlorites of magnesium-ferrous group. The ore has a steel-gray color, granoblastic structure, layered, compact texture, sometimes with microfolds and deformations. The ore has a lenticular layers of quartz. Background of the ore are doubly and triply twinned magnetite and hematite idiomorphs in some cases.

*Conclusions:* The ore zone analysis indicates hydrothermal origin of the ore, which escaped to the earth surface by means of exhalations was deposited as sediment in clayey material. These deposits were metamorphosed in the chlorite facies.

**Key words:** Vrbno; Jesieniki; magnetite; ore; petrography.

**J Biol Earth Sci 2011; 1(1): E1-E6**

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Original Submission: 26 October 2011; Revised Submission: 18 November 2011; Accepted: 20 November 2011

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ISSN: 2084-3577

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## STRESZCZENIE

**Wst p:** Przedmiotem niniejszej pracy jest efekt badań kilku kopanek w okolicy Mała Moravka-Karlova Studianka, w których znajduje się ruda magnetytowa, z chlorytami żelazistymi.

**Materiały i metody:** Próbkę pobrano bezpośrednio ze złoża oraz z otoczenia rudy, następnie przeprowadzono obserwacje próbek w mikroskopie, w świetle przechodzącym i odbitym, oraz analizę rentgenowską XRD i SEM-EDS.

**Wyniki:** W łupkach kwarcowo-chlorytowych występuje struktura fibroblastyczna z licznymi mikrofałdami. Analiza rentgenograficzna skał wskazuje obecność kalcytu, kwarcu oraz chlorytów żelazistych z grupy magnezowo-żelazowej. Ruda charakteryzuje się stalowo-szarą barwą, strukturą granoblastyczną, teksturą zbitą, warstwową, niekiedy z mikrofałdami. Ruda posiada soczewkowate warstwy kwarcu. Tło rudy stanowią podwójnie oraz potrójnie zbliżniaczone idioblasty magnetytu i niekiedy hematytu.

**Wnioski:** Analizy strefy rudnej wskazują na hydrotermalne pochodzenie rudy, która wydostawszy się na powierzchnię ziemi za pomocą ekshalacji została zdeponowana jako osad w materiale ilastym. Osady te zostały zmetamorfizowane w facji chlorytowej.

**Słowa kluczowe:** Vrbno; Jesieniki; magnetyt; ruda; petrografia.

**J Biol Earth Sci 2011; 1(1): E1-E6**

## WPROWADZENIE

Omawiany teren znajduje się we wschodnich Sudetach [1, 2], w jednostce Masywu Desny, należącej do mikrokontynentu Bruno-Vistulicum (Fig. 1). W jednostce tej znajduje się płaszczowina Vrbna z seriami osadów dewońskich [3, 4]. Płaszczyzna ta leży na wschód od kolizyjnej strefy Novego Mesta [5, 6], należącej do serii Hrabiszyskiej [7].

Omawiane złożo znajduje się w utworach zmetamorfizowanych regionalnie w facji chlorytowej w warunkach umiarkowanego gradientu geotermalnego [4]. Wiek tych

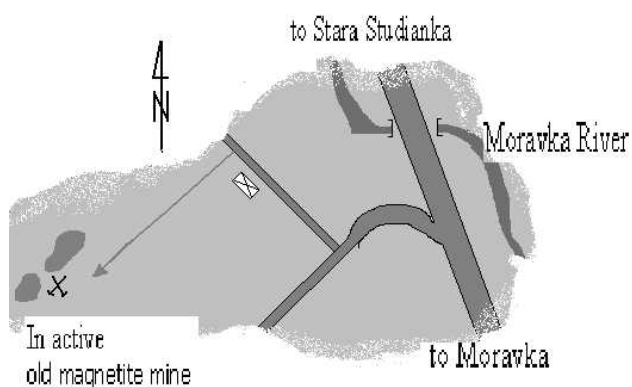
skał datowany jest na 340-325 mln lat. Są to sedymenty basenu Morawsko-Śląskiego wykształcone w postaci kwarcytów, łupków łyszczykowych i metawulkanitów [8]. Wśród tych skał występują złoża rudne strefy Mała Moravka i Vrbno, które są NE przedłużeniem strefy Medlov-Karlova-Benkov, zlokalizowanej przy przełomie górno-morawskim. Ciało te zaliczane są do typu Lahn Dill [9].

Przedmiotem niniejszej pracy jest efekt badań kilku kopanek w okolicy Mała Moravka – Karlova Studianka, w których znajduje się ruda magnetytowa, z żelazistymi chlorytami (Fig. 2). Ruda ta była eksploatowana na tych terenach już z początkiem XIV w. Kopanki te odsłaniają się w lesie nieopodal drogi w okolicy miejscowości Vrbno pomiędzy Moravką a Starą Studianką, przy moście na rzece Moravka. Odsłaniają się liczne hałdy w stoku niewielkiego wzgórza, widocznego po stronie zachodniej od w/w drogi. Idąc w lesie ku SW od mostku na rzece Moravka leśną drogą napotykane są doły po zapadniętych sztolniach i stare wyrobiska (Fig. 3). W niektórych stoi woda. Otoczeniem rud żelaza są łupki chlorytowo-kwarcowe, w których występują soczewki ułożonej warstwowo rudy magnetytowo-kwarcowej.



**Fig. 1.** Schematic structural-kinematic map of the Sudetes (on the basis of Z. Cymerman, 2000, simplified by the author). Schematyczna strukturalno-kinematyczna mapa Sude-tów (na podstawie Z. Cymerman, 2000, uproszczona przez autora).

Legends: BU – Bardo unit; ESD – Eastern Sudetes metamorphic units; IZC – Izera metamorphic complex; KAC – Kaczawa metamorphic complex; KMC – Kłodzko metamorphic complex; LSZ – Leszczyńiec dextral shear zone; NSZ – Niemcza sinistral shear zone; OSD – Orlica Śnieżnik dome; RJ – Rudawy Janowickie metamorphic complex; ZSTZ – Złoty Stok – South Karkonosze metamorphic complex; SMC – Strzelin metamorphic complex; ZSTSZ – Złoty Stok – Trzebiechów sinistral shear zone; ophiolites: B – Braszowice; NR – Nowa Ruda; S – Ślęza.



**Fig. 2.** Location of the old magnetite mines between the villages of Stara Studianka and Moravka (author Miłosz Huber).  
Lokalizacja starych kopalni magnetytu pomiędzy miejscowościami Stara Studianka i Moravka (autor Miłosz Huber).

## MATERIAŁY I METODY

Autor zebrał próbki bezpośrednio ze złoża oraz z otoczenia rudy, przeprowadził obserwacje próbek w mikroskopie w świetle przechodzącym i odbitym, oraz dokonał analizę rentgenowską XRD, ICP-MS i SEM-EDS.

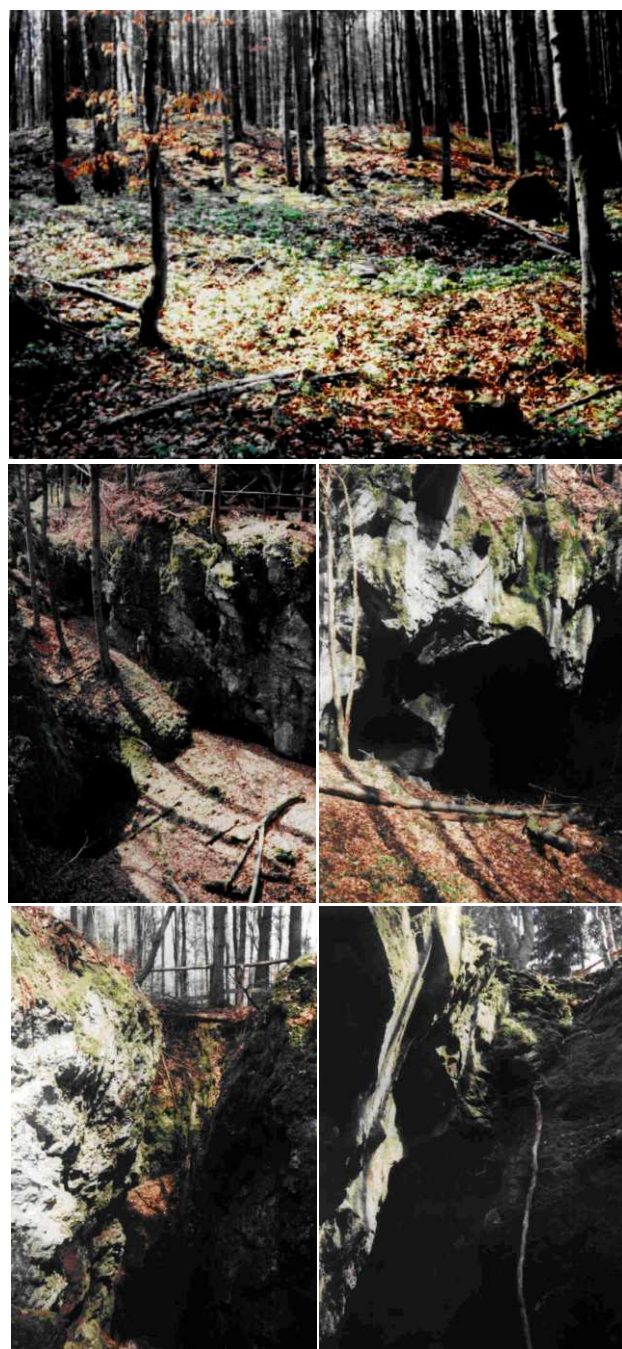
## WYNIKI

### Łupki chlorytowo–kwarcowe

W łupkach kwarcowo–chlorytowych występuje struktura fibroblastyczna z licznymi mikrofałdami (Fig. 4 a). Skały te mają bardzo dobrze widoczną teksturę liściastą, kierunkową, silnie zafałdowaną. Mikrofałdy często ulegają fleksuralnemu zwężeniu w strefach skrzydłowych i pogrubieniu w strefach siodłowych (fig. 4b). Zbudowane są one głównie z chlorytu (71%), kwarcu (13%), materii organicznej (7%), kalcytu (5%), hematytu (4%). Tło skały stanowią zdeformowane blasty chlorytu, tworzące laminy wraz z kwarcem (fig 4c, d). W interstycjach chlorytów znajduje się rozproszona materia organiczna oraz hematyt.

W skale widoczne są też drobne laminy zbudowane kalcytu. Występuje tu szereg mikrouskoków, przypominających struktury palmowe, wytyczających powierzchnie S (podkreśloną przez hematyt i kwarc) oraz nowe powierzchnie S podkreślone przez nowe żyły mineralne (głównie kwarcowe). Występujące w skałach lineacje elongacyjne są mocno zaburzone i trudne do jednoznacznej interpretacji, szczególnie w wyniku dużych deformacji chlorytu powstałej na skutek oddziaływania naprężeń zginających i ścinających.

W skale widoczne są także rozwalcowane wrzecionoblasty kwarcu. Struktury te świadczą o dynamice procesów formowania się i metamorfizmu tych skał. Analiza rentgenograficzna skał wskazuje na obecność kalcytu,



**Fig. 3.** Photographs of mining operations remains.  
Fotografie pozostałości po pracach górniczych.

kwarcu oraz żelazistych chlorytów z grupy magnezowo–żelazawej (Fig. 5).

### Ruda magnetytowo–kwarcowo–kalcytowa

Ruda charakteryzuje się stalowo–szarą barwą, strukturą granoblastyczną, teksturą zbitą, warstwową, niekiedy z mikrofałdami. Ruda posiada soczewkowate warstwy kwarcu. Widoczne są żyły kwarcowe, liczące strefę rudną (Fig. 6 a, b). Tło rudy stanowią podwójnie i potrójnie zbliźniaczone idiomasty magnetytu (46%, co potwierdzają też badania EDS) i niekiedy hematytu (3%), tworzących różnej grubości (od kilku części mm do cm) warstewki (Fig. 6 c, d). W interstycjach magnetytu



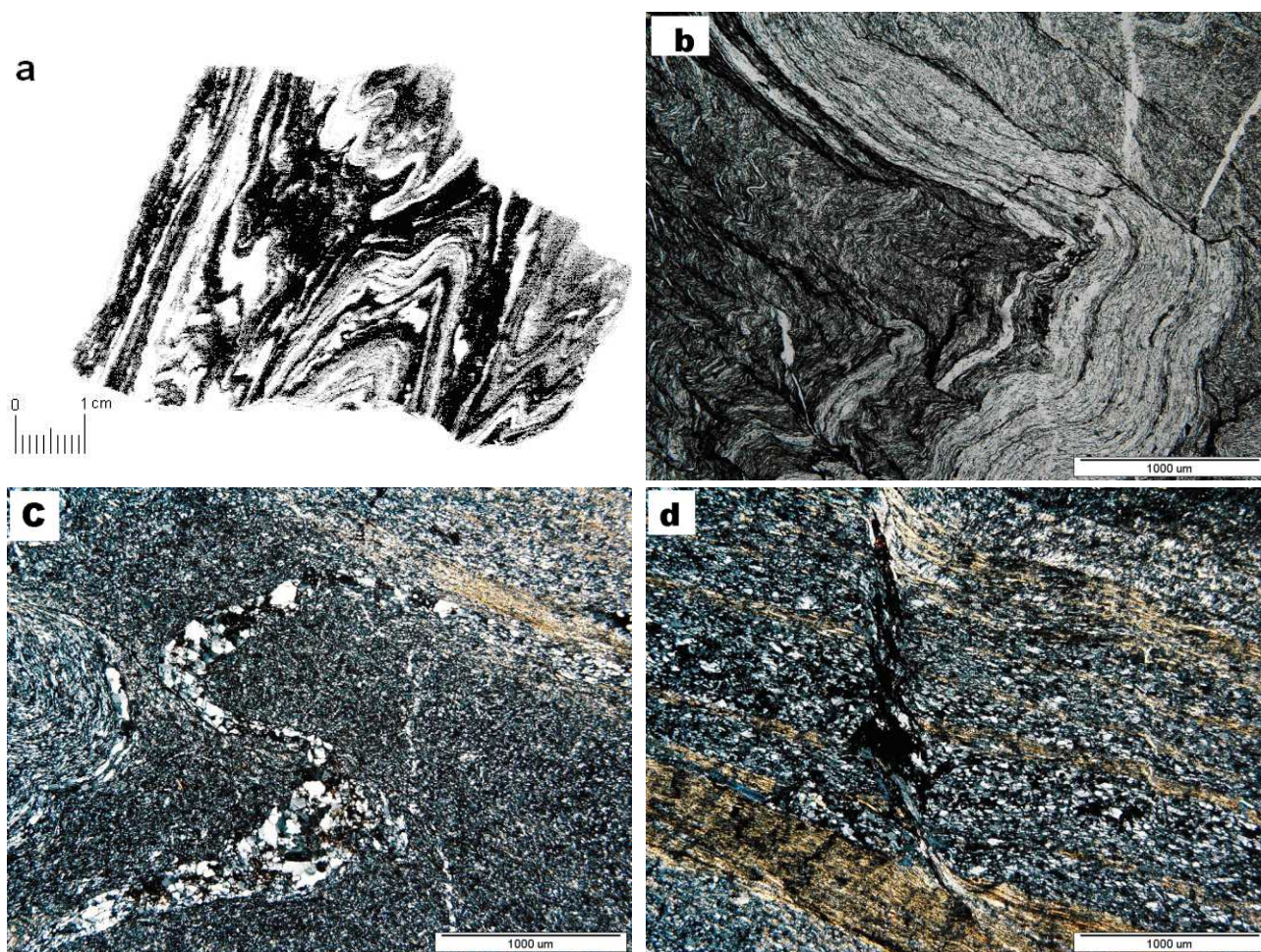


Fig. 4. Macro- (a) and microphotographs (transmitted light at one nicol: b, and with crossed pollars: c, d) of chlorite-quartz schist.

Makro- (a) i mikrofotografie (w świetle przechodzącym przy jednym nikolu: b, i przy nikolach skrzyżowanych: c, d) łupku chlorytowo-kwarcowego.

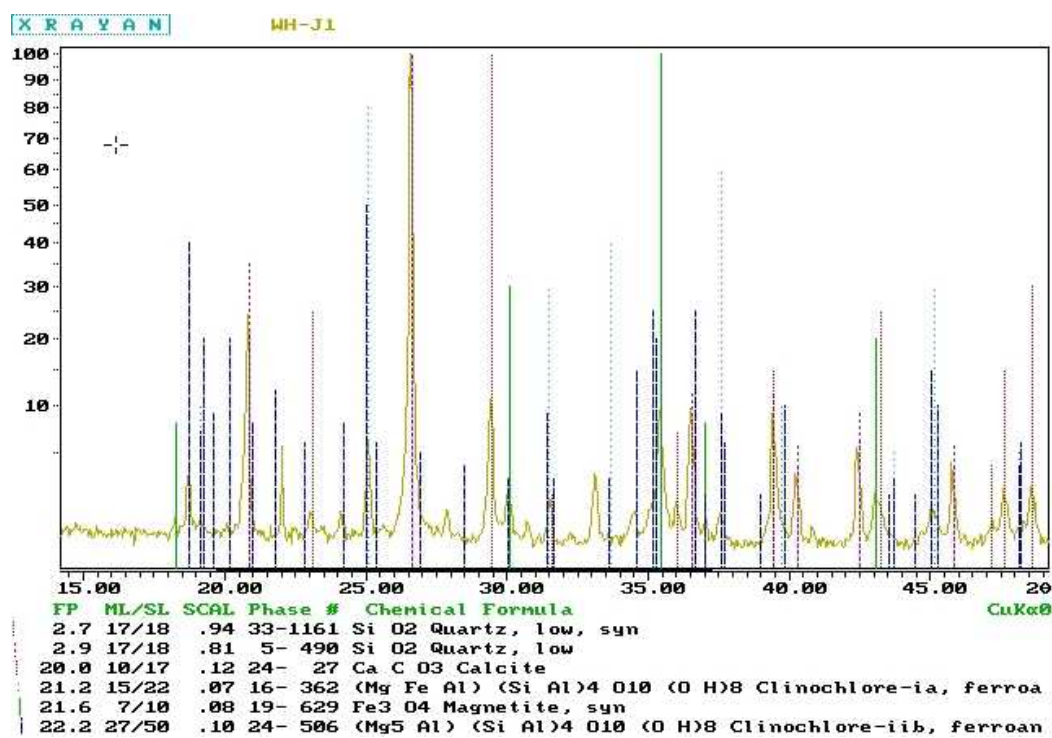
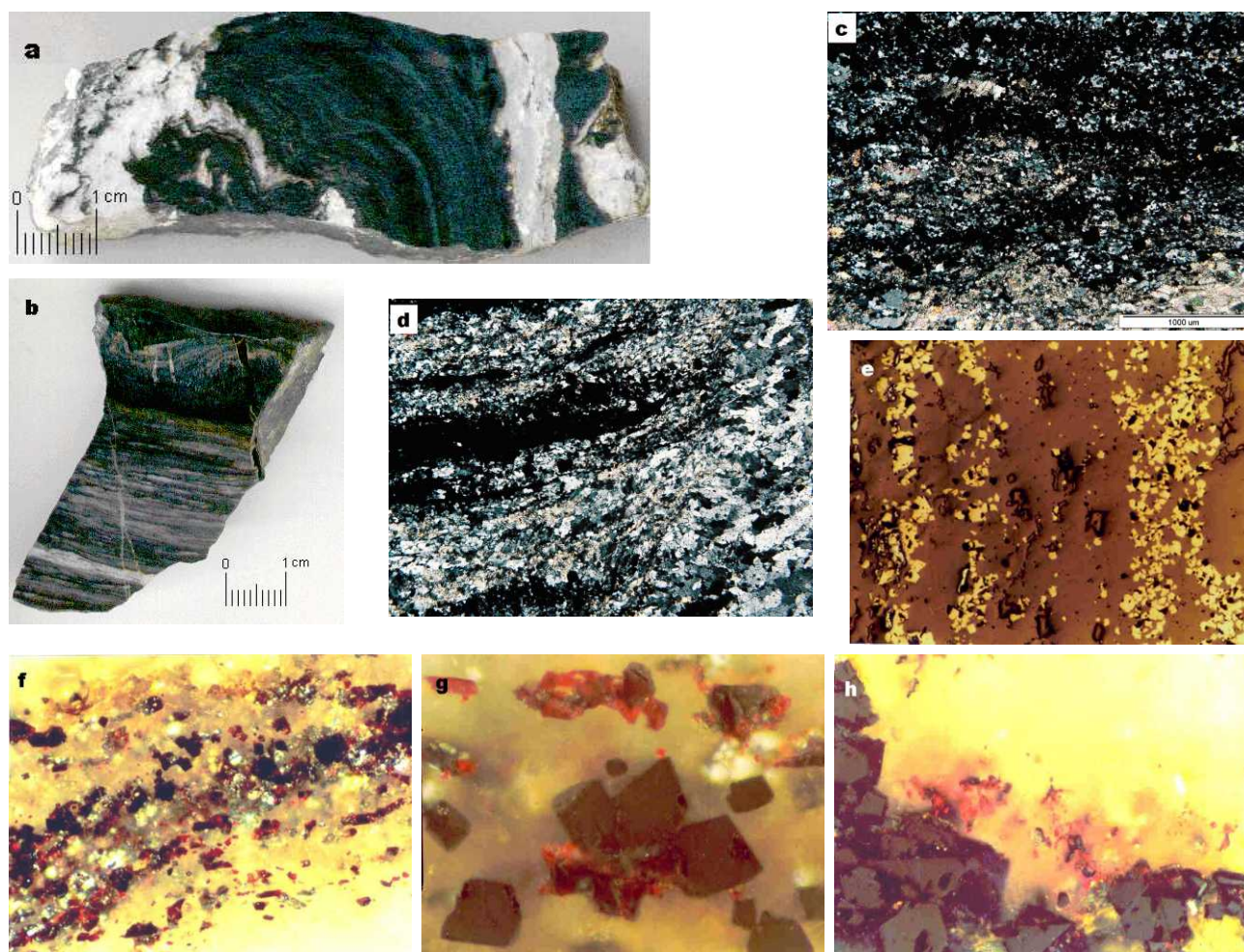


Fig. 5. Results of powder XRD analysis of chlorite-quartz schist.

Wyniki proszkowej analizy XRD łupku chlorytowo-kwarcowego.





**Fig. 6.** Macro- (a, b) and microphotographs (transmitted light: c, d and reflected: e, f, g, h, crossed pollars) of the quartz-calcite-magnetite ore.

Makro- (a, b) i mikrofotografie (w świetle przechodzącym: c, d i odbitym: e, f, g, h, nikole skrzyżowane) rudy kwarcowo–kalcytowo–magnetytowej.

**Table 1.** The chemical composition of samples of magnetite ore.

Skład chemiczny próbki rudy magnetytowej.

Probe Próba	As	Mo	Cr	W	Zn	Cd	Co	Ni	Fe	Mn	V	Cu	Ti	Au
[ppm]	56,37	505,79	15,82	0,71	51,02	45,68	6,91	113,64	326617,6	362,97	66,10	4,88	245,54	1,25

widoczne są kryształy kwarcu (31%) i kalcytu (15%), tworzące osobne laminy. W sąsiedztwie magnetytu spotyka się też chloryty (5%).

Naprzemianległe warstewki magnetytu z kwarcem, chlorytami i kalcytem ukazują osadowy charakter rudy. Struktura magnetytu wskazuje na procesy rekrystalizacji (regeneracji) w warunkach metamorfizmu facji chlorytowo–epidotowej. Magnetyt wykazuje ponadto wtórne procesy martenitacji, o czym świadczą hematytowe pseudomorfozy. Hematyt występuje w skale w postaci samodzielnych ziaren, jak również i wewnątrz blastów magnetytu (Fig. 6 g, h).

Analiza chemiczna próbki (Tab. 1) wskazuje na

domieszki Mo, Ti, Ni, które świadczą o magmowym – zasadowym środowisku pochodzenia rudy. Stosunkowo dużą ilość Mn w próbce wskazuje sedimentacyjny charakter osadu, który mógł wydostać się na powierzchnię jako produkt ekshalacji hydrotermalnej w warunkach podmorskich [9-12].

## WNIOSKI

Analizy strefy rudnej wskazują na hydrotermalne pochodzenie rudy, która wydostawszy się na powierzchnię ziemi za pomocą ekshalacji została zdeponowana jako osad w materiale ilastym. Osady te zostały zmeta-

morfizowane w facji chlorytowej. Podczas metamorfizmu tych skał doszło do powstania mikrofałdów i mikrouskoków. Wskazuje to na dużą dynamikę środowiska, która prawdopodobnie towarzyszyła aktywności pobliskich nasunięć. Żyły kwarcowe tną uformowane struktury metamorficzne związane są z intensywną tektoniką, która spowodowała budinaż niektórych warstw (dobrze to ilustruje Fig. 6a). Są one związane z procesami metamorficznymi obejmującymi omawianą serię skał.

Procesy wietrzenia objawiające się występowaniem hematytu i martytu ograniczają się zwykle do stref propagacji rozciągłości towarzyszących uskoku w skałach. Obecny stan kopanek jak i ilość występującej w nich rudy nie przedstawia sobą nagromadzenia o charakterze gospodarczym. Warstwowy charakter rudy może stanowić przesłanki do poszukiwań kontynuacji rudy, jednakże niewielka jej miąższość nie budzi oczekiwań na większe nagromadzenia magnetytu w tym rejonie.

## PIŚMIENNICTWO

1. Oberc J. Blok Karkonosko-Iżerski, Budowa geologiczna Polski, vol. 4, in: Tektonika, part 2, Sudety. Wyd. Geologiczne 1972: 86-111.
2. Kryza R. Dolnopaleozoiczne ortognejsy w Sudetach: Łuk magmowy, czy ryft kontynentalny? PTMin – Prace Spec. 1997; 9: 116-119.
3. Mazur S. Zarys budowy geologicznej masywu Karkonosko-Iżerskiego i jego pozycja obrębie Waryscydów środkowej Europy. PTMin – Prace Spec. 1998; 11: 31-41.
4. Mazur S., Kalińska M. Wprowadzenie w geologię Sudetów wschodnich na tle budowy wschodniej krawędzi masywu czeskiego. PTMin – Prace Spec. 1997; 9: 29-38.
5. Cymerman Z. Czy istnieją różnice pomiędzy Sudetami Zachodnimi a Wschodnimi? PTMin – Prace Spec. 1997; 9: 77-79.
6. Cymerman Z. Tektonika ucieczkowa i kliny terranowe Masywu Czeskiego. Przegląd Geologiczny 2000; 48(4): 336-344.
7. Oberc J. Sudety Wschodnie, Budowa geologiczna Polski, vol. 4, Tektonika, part 2, Sudety. Wyd. Geologiczne, 1972: 224-240.
8. Dallmeyer R.D., Franke W., Weber K. Pre-Permian Geology of Central and Eastern Europe. Springer 1995.
9. Zimnoch E. Zmetamorfizowane złoża rud żelaza w Sudetach na tle innych złóż tego typu. Geologica Sudetica 1967; 3.
10. Mochnacka K., Pošmurny K. Metallogenic characteristics of the Paleozoic and pre-Paleozoic formations of the northern part of the Bohemian Massif (Krkonoše–Jizerske hory region). Časopis pro mineralogii a geologii. 1981; 26: č. 1.
11. Mochnacka K. Mineralizacja polimetaliczna wschodniej osłony metamorficznej granitu Karkonoszy i jej związek z geologicznym rozwojem regionu. Biuletyn Instytutu Geologicznego. 1982: 341.
12. Mochnacka K. Prawidłowości wykształcenia mineralizacji kruszcowej w metamorficznej osłonie granitu Karkonoszy – próba powiązania ze środowiskiem geotektonicznym. PTMin – Prace Spec. 2000; 16: 169-190.



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**Petrograficzna charakterystyka skał ze złoża magnetytu z Vrbna (Jesieniki - Czechy)**

Huber M.